# What is claimed is:

WHAT IS CLAIMED

1. A method of transmitting information comprising the steps of:

(a) generating a quadrature phase shift keyed (QPSK) waveform in accordance with a carrier signal and a data signal whose contents are representative of said information, so as to inject a prescribed amount of energy of said carrier signal into said QPSK waveform; and

(b) transmitting the QPSK waveform generated in step (a).

2. A method according to claim 1, further including the steps of:

(c) receiving the QPSK waveform transmitted in step (b); and

(d) processing the QPSK waveform received in step (c) to extract said carrier signal therefrom.

3. A method according to claim 2, further including the step of:

(e) processing the QPSK waveform received in step (c) using the carrier signal extracted therefrom in step (d) to derive said data signal.

4. A method according to claim 3, wherein said data signal is encoded with a forward error correction code, and further including the step (f) of decoding the encoded data signal to recover said information from said data signal.

5. A method according to claim 4, wherein said forward error correction code is one capable of extending error rate performance to a value of energy per bit to noise density ratio ($E_b/N_0$) less than 4 dB.

6. A method according to claim 1, wherein step (a) comprises spreading energy of said carrier signal within said QPSK waveform.

7. A method according to claim 6, wherein step (a) comprises modulating said data signal with a spreading waveform to produce a carrier-spreading signal, and multiplying relatively quadrature components of said carrier signal with said carrier-spreading signal to produce said QPSK waveform containing said prescribed amount of energy of said carrier signal.

8. A method according to claim 7, wherein step (a) comprises imparting offsets to logic levels of said data signal in accordance with said spreading waveform to produce said carrier-spreading signal, and multiplying relatively quadrature components of said carrier signal with said carrier-spreading signal to produce said QPSK waveform containing said prescribed amount of energy of said carrier signal.

9. A communication system comprising:

a quadrature phase shift keyed (QPSK) waveform generator, which is operative to produce a QPSK waveform in accordance with a carrier signal and a data signal whose contents are representative of information, such that a prescribed amount of energy of said carrier signal is injected into said QPSK waveform; and

a transmitter which is operative to transmit said QPSK waveform produced by said QPSK waveform generator.

10. A communication system according to claim 9, further including a receiver which is operative to receive said QPSK waveform and to extract said carrier signal therefrom.

11. A communication system according to claim 10, wherein said receiver is operative to process said QPSK waveform using said extracted carrier signal to derive said data signal.

12. A communication system according to claim 11, further including an encoder which is operative to encode said data signal with a forward error correction code, and wherein said receiver is operative to decode the encoded data signal to recover said information from said data signal.

13. A communication system according to claim 12, wherein said forward error correction code is one capable of extending error rate performance to a value of $E_b/N_0$ less than 4 dB.

14. A communication system according to claim 9, wherein said QPSK waveform generator is operative to spread energy of said carrier signal within said QPSK waveform.

15. A communication system according to claim 14, wherein said QPSK waveform generator is operative to modulate said data signal with a spreading waveform to produce a carrier-spreading signal, and to multiply relatively quadrature components of said carrier signal with said carrier-spreading signal to produce said QPSK waveform containing said prescribed amount of energy of said carrier signal.

16. A communication system according to claim 15, wherein said QPSK waveform generator is operative to shift logic levels of said data signal in accordance with said spreading waveform to produce said carrier-spreading signal, and to multiply relatively quadrature components of said carrier signal with said carrier-spreading signal to produce said QPSK waveform containing said prescribed amount of energy of said carrier signal.

17. A method comprising the steps of:

(a) providing a carrier signal;

(b) providing a data signal; and

(c) combining relative quadrature versions of said carrier signal with said data signal in such a manner as to produce a quadrature phase shift keyed (QPSK) waveform having a power spectrum that contains a prescribed amount of carrier signal power.

18. A method according to claim 17, further including the steps of:

(d) transmitting the QPSK waveform produced in step (c);

(e) receiving the QPSK waveform transmitted in step (d);

(e) conducting non-regenerative recovery of the QPSK waveform received in step (e) to extract said carrier signal therefrom; and

(f) processing the QPSK waveform received in step (e) using the carrier signal extracted therefrom in step (e) to recover said data signal.

~~19~~ 14. A method according to claim ~~18~~ 13, wherein said data signal contains information encoded with a forward error correction code, and further including the step (g) of decoding the encoded data signal to recover said information.

20. A method according to claim 19, wherein said forward error correction code is a code capable of extending error rate performance to a value of energy per bit to noise density ratio ($E_b/N_0$) less than 4 dB.

21. A method according to claim 17, wherein step (c) comprises spreading power of said carrier signal within the power spectrum of said QPSK waveform.

22. A method according to claim 21, wherein step (c) comprises modulating said data signal with a spreading waveform to produce a carrier-spreading signal, and multiplying relatively quadrature components of said carrier signal with said carrier-spreading signal to produce said QPSK waveform containing said prescribed amount of carrier signal power spread therein.

23. A method comprising the steps of:

(a) receiving a quadrature phase shift keyed (QPSK) waveform having relative quadrature components of a carrier modulated with a data signal;

(b) conducting non-regenerative recovery of the QPSK waveform received in step (a) to extract said carrier signal.

24. A method according to claim 23 further including the step (c) of processing the QPSK waveform received in step (a) using the carrier signal extracted therefrom in step (b) to recover said data signal.

25. A method according to claim 24, wherein said data signal contains information encoded with a forward error correction code capable of extending error rate performance to a value of energy per bit to noise density ratio ($E_b/N_0$) less than 4 dB, and further including the step (d) of decoding the encoded data signal to recover said information.

26. A method according to claim 23, wherein QPSK waveform has been produced by modulating said data signal with a spreading waveform to produce a carrier-spreading signal, and multiplying relatively quadrature components of said carrier signal with said carrier-spreading signal to produce said QPSK waveform containing a prescribed amount of carrier signal power spread therein.